Bridging the Gaps: NanoInfoBio

Project Lifecycle

Manchester Metropolitan University

EPSRC
Engineering and Physical Sciences Research Council


NanoInfoBio:
World-class research in nanotechnology, informatics and biology.
Manchester Metropolitan University

- EPSRC ‘Bridging the Gaps’ Funded
- PI – Martyn Amos, School of Computing, Mathematics and Digital Technology
- Total funding: £360,118.75
- Start date: September 2009
- Completion date: September 2011

- Current status – 2/3 complete

Our goals…

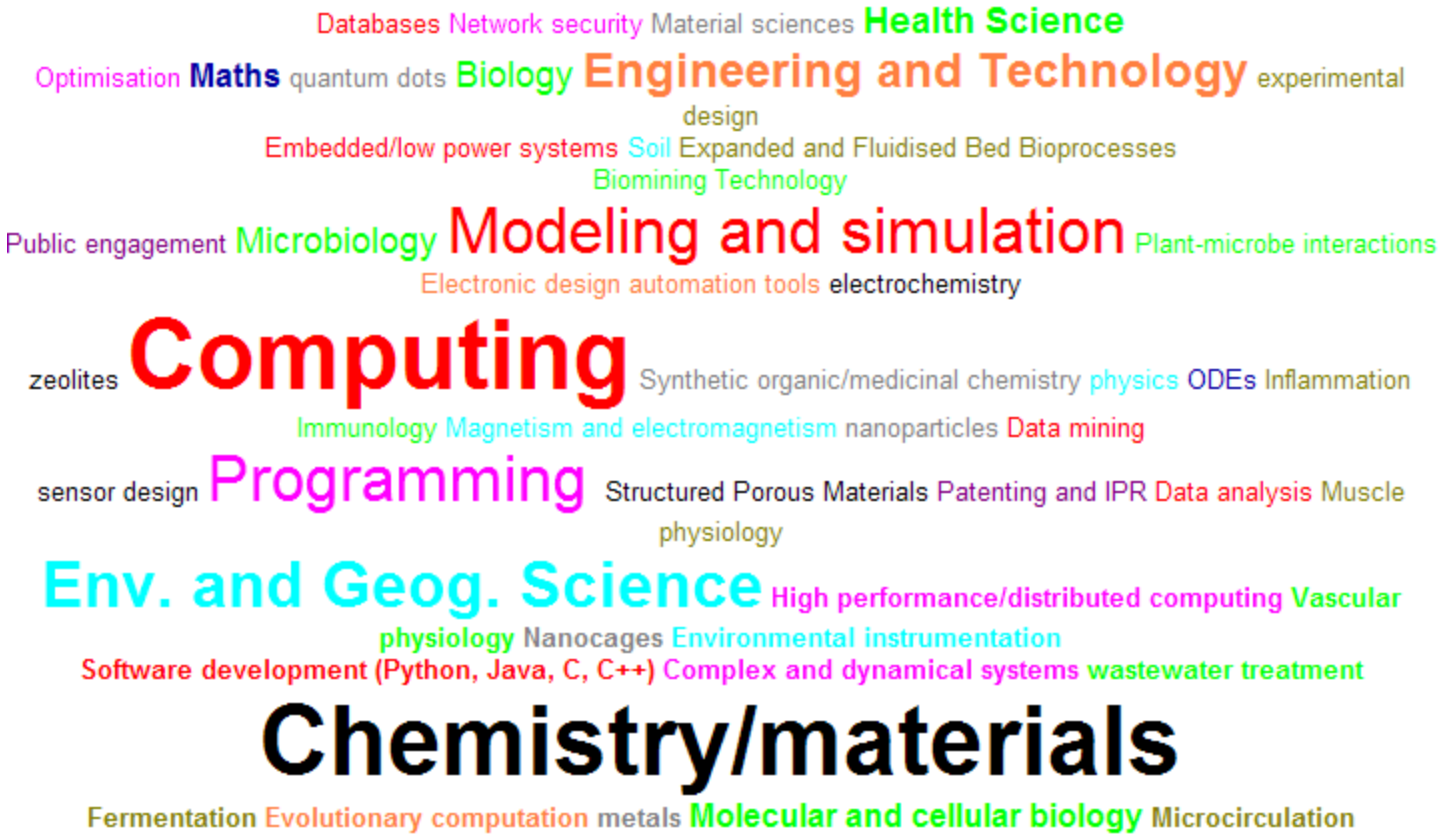
- To build (and strengthen) links between *computational scientists/mathematicians/engineers* and their counterparts in the *natural/life/health sciences*.
- Fine-grained project support that will maximise opportunity for involvement and encourage serendipitous contact between different disciplines

NanoInfoBio

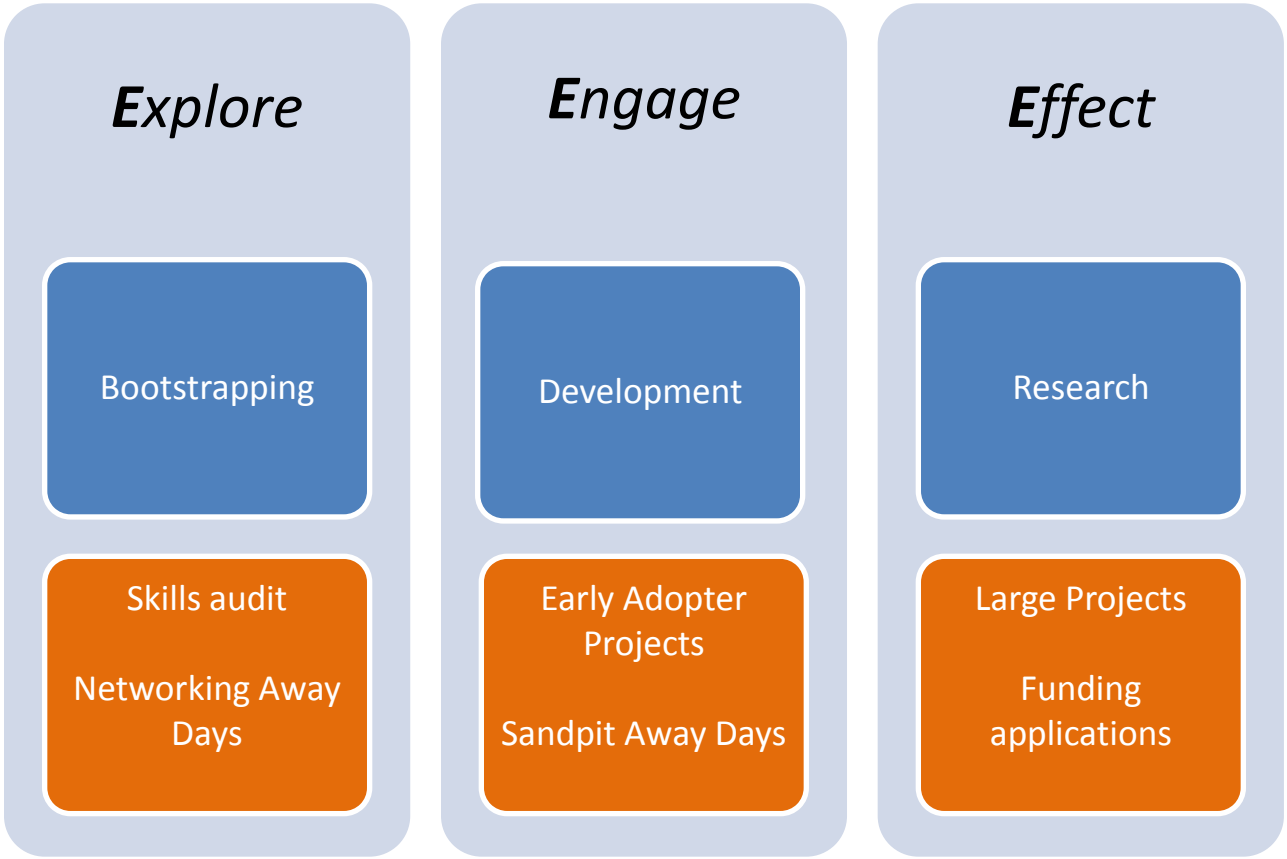
- Nanotechnology
- Informatics
- Biology

Linkages between the three

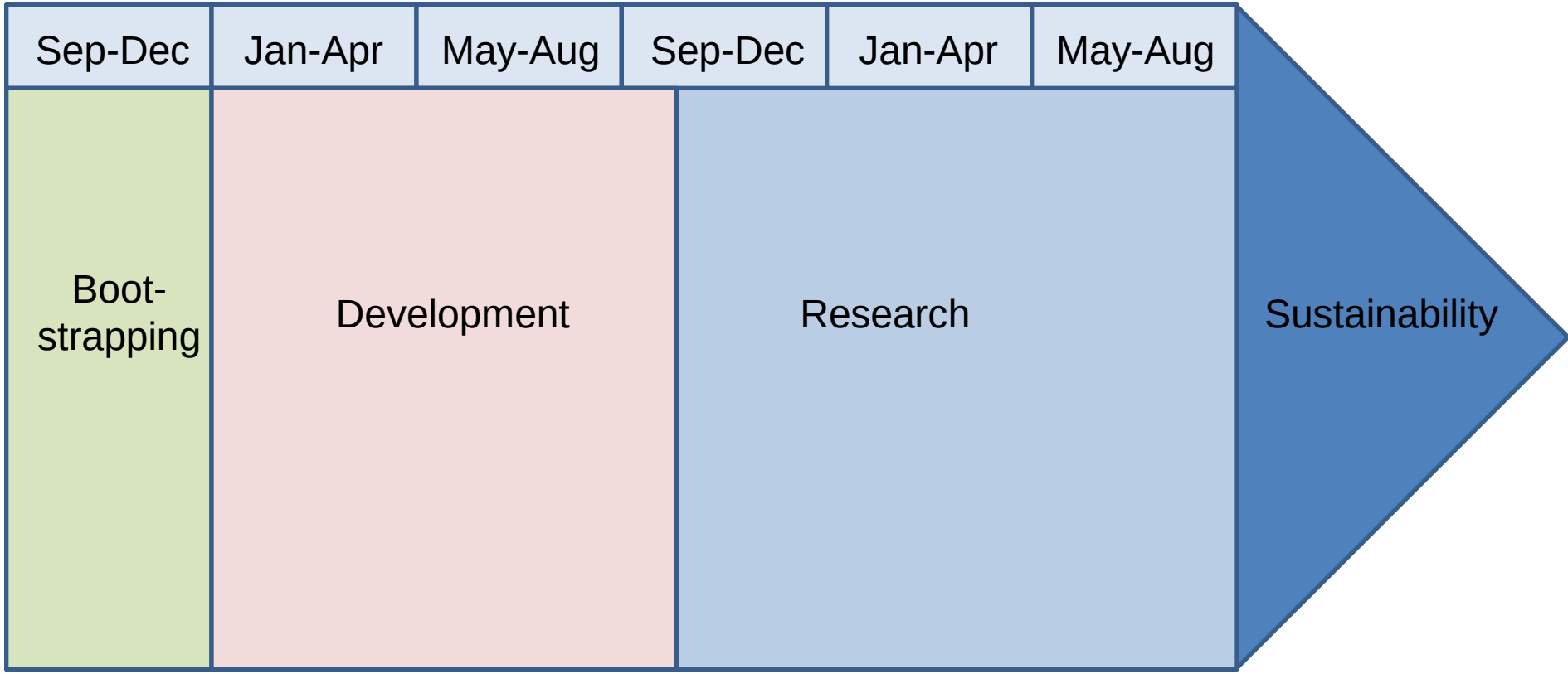
Who is NIB?


Databases Network security Material sciences Health Science
Optimisation Maths quantum dots Biology Engineering and Technology experimental design
Embedded/low power systems Soil Expanded and Fluidised Bed Bioprocesses
Biomining Technology
Public engagement Microbiology Modeling and simulation Plant-microbe interactions
Electronic design automation tools electrochemistry
zeolites Computing Synthetic organic/medicinal chemistry physics ODEs Inflammation
Immunology Magnetism and electromagnetism nanoparticles Data mining
sensor design Programming Structured Porous Materials Patenting and IPR Data analysis Muscle physiology
Env. and Geog. Science High performance/distributed computing Vascular physiology Nanocages Environmental instrumentation
Software development (Python, Java, C, C++) Complex and dynamical systems wastewater treatment
Chemistry/materials
Fermentation Evolutionary computation metals Molecular and cellular biology Microcirculation

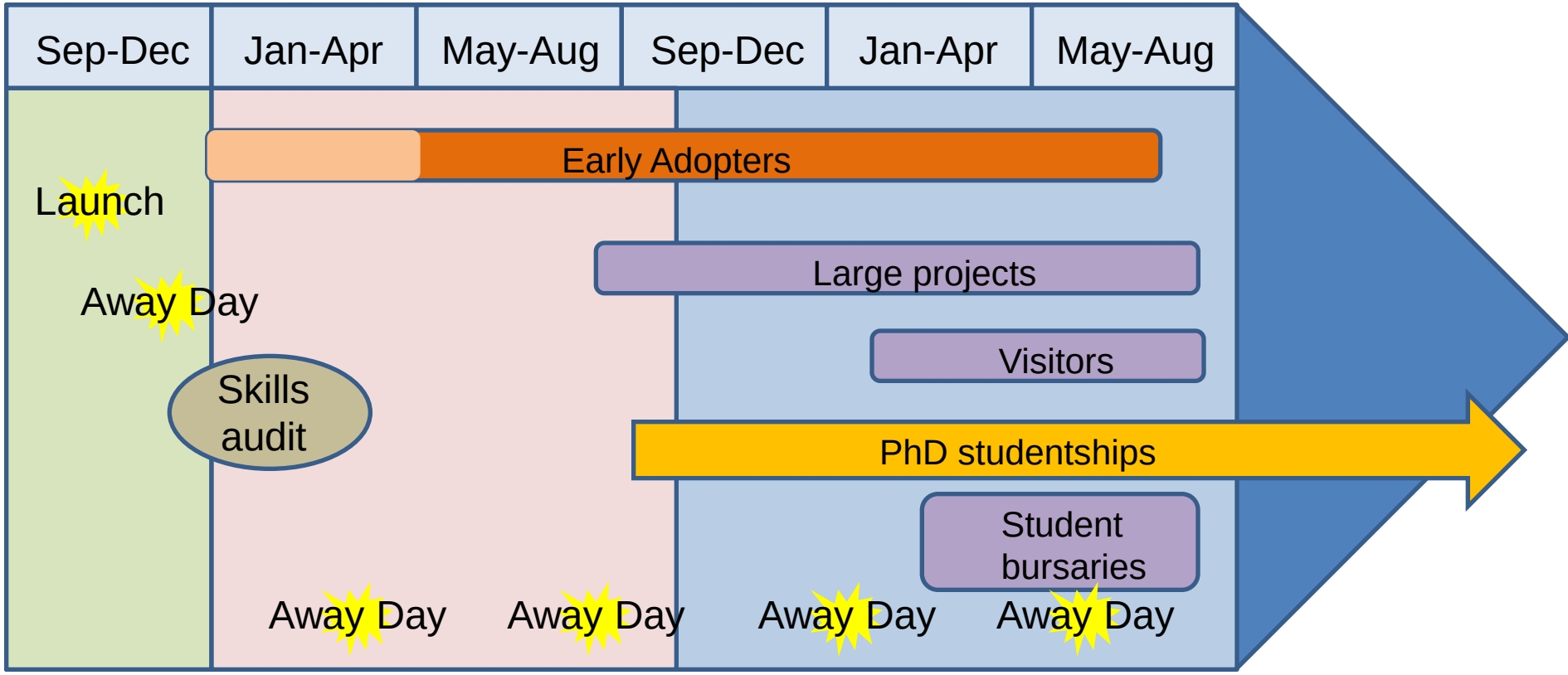
How to achieve results?



Project lifecycle



Project lifecycle



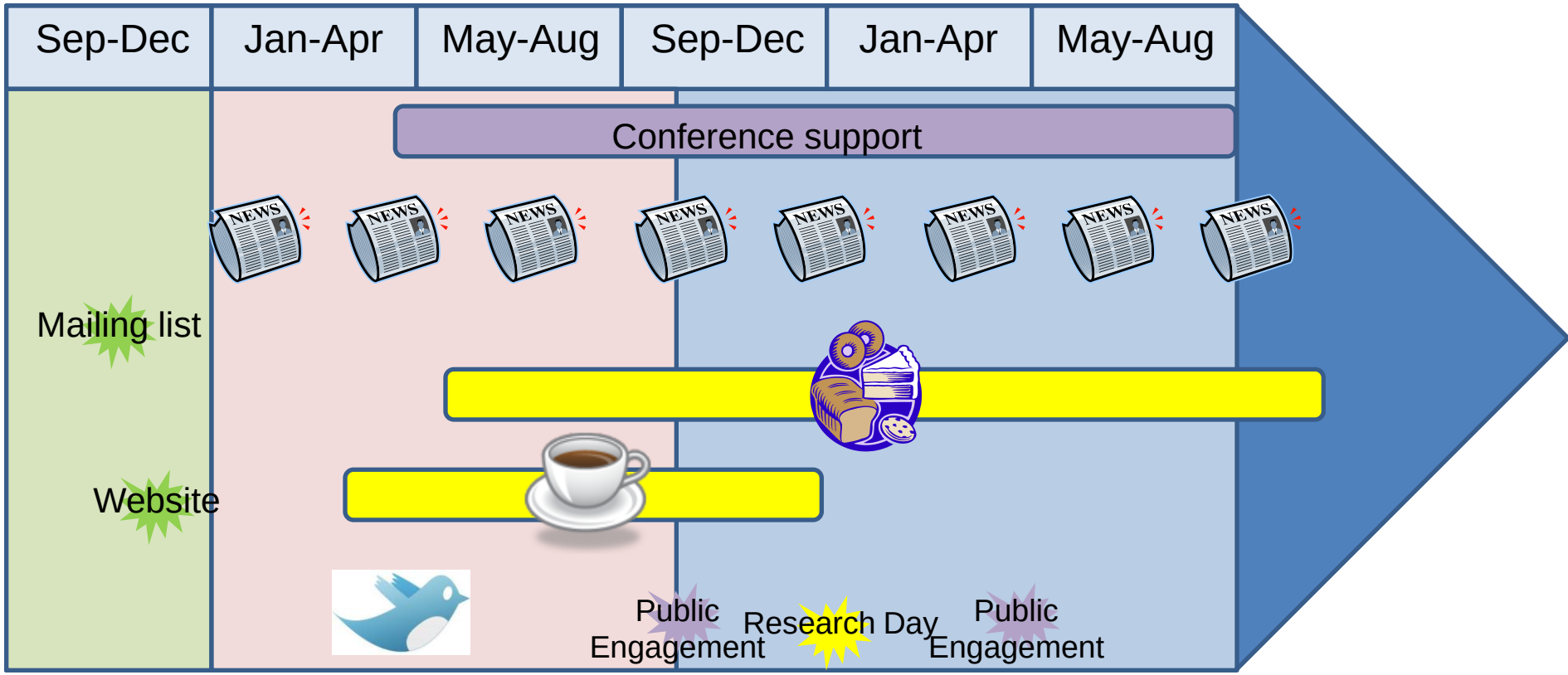
Research – Case studies

- Early Adopters
  - Computer visual tracking of muscle contraction
  - Development of an image analysis package for objective plaque identification
  - Nanotoxological influence of nanoparticles on small blood vessel function
  - Antibacterial nanostructures and their application for water purification

Research – Case studies

- Large projects
  - Determining the extent of fungal deterioration of cine films using nanosensors
  - Muscle analysis via GPUs (based on Early Adopter)
  - DNA hashpooling: A new technique for environmental sample analysis

Communication and networking



Networking and Outreach

Networking and Outreach

Manchester Science Festival
23 - 31 Oct 2010

Feedback

“More events like this please”

“You guys rock!”

“Effie (age 5) really enjoyed making the robot. I really enjoyed making something so simple but so impressive”

Impact

- Intra-institutional impact
  - New research community
  - Over 15 brand new collaborations
  - Raising awareness of interdisciplinary research importance and barriers

Impact

- Research impact
  - Biomedical applications
    - Oncology
    - Physiotherapy
    - Cardiovascular disease
    - Dental science
  - Environmental applications
    - Water purification
    - Fungal spore identification – environmental health

Media coverage

8 September 2010 Last updated at 12:23

Emerging fungal threat to historical film archives

By Pamela Rutherford
Reporter, BBC News

A record of British life on film could be threatened from an emerging 'disease' which eats away at film.

Home movies on cine film, videos and even TV and film archive can end up covered in fungal mould if they are not stored correctly.

Researchers hope to develop special sensors to detect the mould before it does serious damage.

Gavin Bingley is investigating films stored at the North West Film Archive at Manchester Metropolitan University.

Mould on badly stored film can eat away and destroy its contents

Cinematographic film has a layer of gelatin on its surface. This emulsion layer is where the image is formed but also provides ideal food for fungi like *Aspergillus* and *Penicillium*.

Impact

- Public engagement impact
  - Three events at Manchester Science Festival
  - Approx 200 people directly engaged
  - Association with Girl Geeks Manchester and Madlab
  - Bollington SciBar – over 50 attendees

What next?

- Proposal assistance
- Networking and external links
- External visitors
- Student bursaries
- Public engagement
- Conference support
- Funding identification